

Mid-Chapter Review

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$$1a) 5(5^4) \\ = 5^5$$

$$b) \frac{8^8}{8^6} \\ = 8^{8-6} \\ = 8^2$$

$$c) (16^2)^5 \\ = 16^{10}$$

$$d) \frac{(-4)^6 (-4)^3}{((-4)^9)^2} \\ = \frac{(-4)^9}{(-4)^{18}} \\ = (-4)^{9-18} \\ = (-4)^{-9} \\ = \frac{1}{(-4)^9}$$

$$e) \left(\frac{1}{10}\right)^6 \left(\frac{1}{10}\right)^{-4} \\ = \left(\frac{1}{10}\right)^2$$

$$f) \left(\frac{(7)^2}{(7)^4}\right)^{-5} \\ = \left(\frac{(7)^4}{(7)^2}\right)^5 \\ = \frac{7^{20}}{7^{10}} \\ = 7^{20-10} \\ = 7^{10}$$

$$2a) x^{-2} \\ = \frac{1}{x^2}$$

$$b) \left(\frac{1}{y}\right)^{-2} \\ = y^2$$

$$b) (m^{-4})^2 \\ = m^{-8} \\ = \frac{1}{m^8}$$

$$e) (n^{-7})^{-2} \\ = n^{14}$$

$$c) b^{-3} \times b^{-2} \\ = b^{-3+-2} \\ = b^{-5} \\ = \frac{1}{b^5}$$

$$f) y^{-3} \div y \\ = y^{-4} \\ = \frac{1}{y^4}$$

$$\begin{aligned}
 3a) \quad & 5^{-2} + 10^{-1} \\
 &= \frac{1^{x2}}{25^{x2}} + \frac{1^{x5}}{10^{x5}} \\
 &= \frac{2}{50} + \frac{5}{10} \\
 &= \frac{7}{50}
 \end{aligned}$$

$$\begin{aligned}
 b) \quad & 4^0 + 8^{-2} - 2^{-2} \\
 &= 1 + \frac{1}{64} - \frac{1}{4} \\
 &= \frac{64}{64} + \frac{1}{64} - \frac{16}{64} \\
 &= \frac{49}{64}
 \end{aligned}$$

$$\begin{aligned}
 c) \quad & 9^{-1} - (3^{-1})^2 \\
 &= \frac{1}{9} - 3^{-2} \\
 &= \frac{1}{9} - \frac{1}{9} \\
 &= 0
 \end{aligned}$$

$$\begin{aligned}
 d) \quad & (6^{-2})^{-1} + \left(\frac{1}{3}\right)^{-2} \\
 &= 6^2 + 3^2 \\
 &= 36 + 9 \\
 &= 45
 \end{aligned}$$

$$\begin{aligned}
 e) \quad & \left(-\frac{1}{2}\right)^3 + 4^{-3} \\
 &= -\frac{1}{8} + \frac{1}{4^3} \\
 &= -\frac{1^{x8}}{8^{x8}} + \frac{1}{64} \\
 &= -\frac{8}{64} + \frac{1}{64} \\
 &= -\frac{7}{64}
 \end{aligned}$$

$$\begin{aligned}
 f) \quad & 25^{-1} + \left(-\frac{5}{2}\right)^{-2} \\
 &= \frac{1}{25} + \left(-\frac{2^2}{5^2}\right) \\
 &= \frac{1}{25} + \frac{4}{25} \\
 &= \frac{5}{25} \\
 &= \frac{1}{5}
 \end{aligned}$$

$$\begin{aligned}
 4a) \quad & \left(\frac{2}{3}\right)^{-1} \\
 &= \frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 b) \quad & \left(-\frac{2}{5}\right)^{-3} \\
 &= \left(-\frac{5}{2}\right)^3 \\
 &= -\frac{125}{8}
 \end{aligned}$$

$$\begin{aligned}
 c) \quad & \left(\frac{81}{16}\right)^{\frac{1}{2}} \\
 &= \frac{\sqrt{81}}{\sqrt{16}} \\
 &= \frac{9}{4}
 \end{aligned}$$

$$\begin{aligned}
 d) \quad & (64^{\frac{1}{3}})^4 \\
 &= (\sqrt[3]{64})^4 \\
 &= (4)^4 \\
 &= 256
 \end{aligned}$$

$$\begin{aligned}
 e) \quad & \left(\frac{16}{81}\right)^{\frac{1}{4}} \\
 &= \frac{\sqrt[4]{16}}{\sqrt[4]{81}} \\
 &= \frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 f) \quad & [(2^2)(4^2)]^{-1} \\
 &= [4(16)]^{-1} \\
 &= 64^{-1} \\
 &= \frac{1}{64}
 \end{aligned}$$

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$$\begin{aligned} \text{5. a)} \quad a^{\frac{1}{5}} \times a^{\frac{2}{3}} \\ = a^{\frac{3}{15}} \times a^{\frac{10}{15}} \\ = a^{\frac{13}{15}} \end{aligned}$$

$$\begin{aligned} \text{b)} \quad \frac{b^2}{b^{\frac{3}{2}}} \\ = b^{2 - \frac{3}{2}} \\ = b^{\frac{4}{2} - \frac{3}{2}} \\ = b^{\frac{1}{2}} \end{aligned}$$

$$\begin{aligned} \text{c)} \quad \frac{c^{-3}}{c^2} \\ = c^{-3-2} \\ = c^{-5} \\ = \frac{1}{c^5} \end{aligned}$$

$$\begin{aligned} \text{d)} \quad \frac{d^{-3}}{d^{-5}} \\ = d^{-3-(-5)} \\ = d^2 \end{aligned}$$

$$\begin{aligned} \text{e)} \quad e^1(e^{-5})^{-2} \\ = e(e^{10}) \\ = e^{10+1} \\ = e^{11} \end{aligned}$$

$$\begin{aligned} \text{f)} \quad \left(f^{-\frac{2}{3}}\right)^{\frac{5}{8}} \\ = f^{-\frac{10}{24}} \\ = f^{-\frac{5}{12}} \\ = \frac{1}{f^{\frac{5}{12}}} \end{aligned}$$

6 a) Exponential

Radical

Evaluation
of Expression

$$\text{a)} \quad 100^{\frac{1}{2}}$$

$$\sqrt[2]{100}$$

$$10$$

$$\text{b)} \quad 16^{0.25}$$

$$\sqrt[4]{16}$$

$$2$$

$$\text{c)} \quad 121^{\frac{1}{2}}$$

$$\sqrt{121}$$

$$11$$

$$\text{d)} \quad (-27)^{\frac{5}{3}}$$

$$\sqrt[3]{-27^5}$$

$$-243$$

$$\text{e)} \quad 49^{2.5}$$

$$\sqrt[2]{49^5}$$

$$16807$$

$$\text{f)} \quad 1024^{\frac{1}{10}}$$

$$\sqrt[10]{1024}$$

$$2$$

$$\text{g)} \quad \left(\frac{1}{2}\right)^{\frac{9}{3}}$$

$$\sqrt[3]{\left(\frac{1}{2}\right)^9}$$

$$0.125$$

$$\boxed{2.5 = \frac{5}{2}} \quad \boxed{e}$$

$$\begin{aligned} \text{7 a)} \quad \sqrt[6]{2400} \\ = 3.659 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad 0.5^{-0.5} \\ = 1.414 \end{aligned}$$

$$\begin{aligned} \text{8 a)} \quad \sqrt[3]{x} = 125 \\ x = 5 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad 120^{0.8} \\ = 46.06 \end{aligned}$$

$$\begin{aligned} \text{e)} \quad \sqrt[9]{-1024} \\ = -2.16 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad m^{\frac{3}{2}} = 64 \\ m = 16 \end{aligned}$$

$$\text{c)} \quad p^{-3} = \frac{1}{27}$$

$$\begin{aligned} \text{c)} \quad 9^{-\frac{6}{5}} \\ = 0.072 \end{aligned}$$

$$\begin{aligned} \text{f)} \quad 0.2^{-2} \\ = 25 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad \sqrt{x^3} = 8 \\ x = 4 \end{aligned}$$